



AMENDMENTS TO THE CLAIMS

Please amend claims 1-14 and 21, cancel claims 15-20 and cancel claims 22-26 as follows:

Claim 1 (Currently Amended)

An open wireless architecture (OWA) for fourth generation mobile communications said system comprising:

- a) a wireless communication terminal device supporting ~~various~~ different wireless open air interfaces in the same device with same unique identifier based on open Air-Interface BIOS (basic input/output system) signal processing architecture and capable of communicating with other devices, systems or networks through said open Air-Interfaces,
- b) an open computer system equipped with full networking facilities to access various different backbone networks either through wireline networking interfaces or through broadband wireless communication systems of said open Air-Interfaces,
- c) an open base transceiver system supporting various different air interfaces based on said open Air-Interface BIOS signal processing architecture to interconnect said wireless communication terminal device through said open Air-Interfaces,
- d) said base transceiver system connecting to said computer system wirelinely to construct the open base-station as a whole,
- e) said wireless terminal device connecting to different wireline networks through its wireline Network Interface Unit (NIU) in said wireless terminal device,
- f) said base-station connecting to other said base-station either over the wireline networks or over broadband wireless access system through said computer system, or through said base transceiver system of said open Air-Interfaces in an ad-hoc mode, and
- g) said wireless terminal device connecting directly to other said wireless terminal device through said open Air-Interfaces in an ad-hoc mode.

Claim 2 (Currently Amended)

The Open Wireless Architecture (OWA) for fourth generation mobile communications of

claim 1 wherein: both said wireless terminal device and said base-station further comprising:

- a) an open processing engine processing the signals and protocols of said open Air-Interfaces,
- b) a reconfigurable and open digital converter transforming the received analog signals to the digital base-band signals and vice versa, and connecting to said open processing engine,
- c) a programmable and open radio frequency (RF) module and smart antenna processing module of different frequencies supporting said open air-interfaces, and connecting to said digital converter,
- d) a software definable module (SDM) containing processing parameters, algorithms and protocols of said open air-interfaces to be stored in an internal memory, external memory card or downloaded from networks, and
- e) an open wireless BIOS (basic input/output system) signal processing architecture capable of providing the common and open interfaces to said processing engine, said digital converter, said RF module and said SDM, and mapping said open air interfaces into different interface parameters of said ~~open-interfaces~~ signal processing architecture.

Claim 3 (Currently Amended)

The Open Wireless Architecture (OWA) for fourth generation mobile communications of claim 1 wherein: both said wireless terminal device and said base-station further comprising:

- a) an open system software module based on said open wireless BIOS signal processing architecture, supporting dynamic spectrum management, spectrum sharing and open resource management to increase spectrum efficiency and optimize the system performance and wireless transmission performance,
- b) an open convergence layer module converging wireline and wireless networks and services, as well as transmission convergence of said open air-interfaces,
- c) an open configuration management module enabling flexible system re-configuration when said open air-interfaces changing, wireline networking changing or system settings changing, and

d) an open security model for the enhanced security management of the system.

Claim 4 (Currently Amended)

A system as recited in claim 1 wherein said wireless terminal device comprising system software, application software and real-time OS (operating system) running upon the system hardware through said open wireless BIOS signal processing architecture.

Claim 5 (Currently Amended)

A system as recited in claim 2 wherein said open processing engine decodes, de-channelizes and demodulates the open base-band channel signals and control signals of said open air-interfaces into detailed digital signaling, traffic and control information based on said open wireless BIOS signal processing architecture.

Claim 6 (Currently Amended)

A system as recited in claim 1 wherein said base station can be reconfigured and re-programmed as wireless router, ~~mobile soft switch or wireless gateway~~ of said open air-interfaces by integrating said interface parameters through said open wireless BIOS signal processing architecture.

Claim 7 (Currently Amended)

A system as recited in claim 1 wherein said base station can be reconfigured to be a mobile base-station ~~for military applications or special industrial applications~~ that said computer system connecting to said backbone networks through said broadband wireless communication systems ~~of said open air interfaces~~ instead of said wireline networking interfaces.

Claim 8 (Currently Amended)

A system as recited in claim 1 wherein said wireless terminal device and said base-station can communicate each other over said open air interfaces ~~including time division multiple access (TDMA), code division multiple access (CDMA), frequency division multiple access (FDMA)~~ ~~or other user defined interfaces~~ based on said open wireless BIOS signal processing

architecture.

Claim 9 (Currently Amended)

A method as recited in claim 8 detecting said open air-interfaces for said wireless terminal device and said base-station, said method comprising:

- a) performing initial channel processing from the received signals based on said interface parameters of said open wireless BIOS signal processing architecture,
- b) scanning frequency carrier from the received signals of said open air interfaces,
- c) performing different decoding scheme from the received signals of said open air interfaces,
- d) performing different demodulation scheme from the received signals of said open air interfaces, and
- e) calculating radio link parameters and models of said open wireless BIOS signal processing architecture.

Claim 10 (Currently Amended)

A system as recited in claim 1, wherein said base-station further comprising:

- a) open operating systems ~~including Windows, Linux or user-defined~~ supporting said open air-interfaces,
- b) open resource management including spectrum, bandwidth, channels, capacity, processors, power, storage and services based on said open wireless BIOS signal processing architecture,
- ~~e) open communication application software enabling user-friendly programming and services,~~
- d) common objects library and functional components defining the converged processing elements and open interface parameters of said open wireless BIOS signal processing architecture ,
- e) open configuration management including system reconfiguration in base-band parts, RF (radio frequency) parts, antenna parts, networking parts and service parts.

Claim 11 (Currently Amended)

A system as recited in claim 2 wherein said open wireless BIOS signal processing architecture further defining the basic interface structure for said open air-interfaces, said open air-interfaces switching, said open system modules as well as switching between internal and external open modules of said open air-interfaces.

Claim 12 (Currently Amended)

A method as recited in claim 2 utilizing said smart antenna processing module for said wireless terminal device and said base-station, said method comprising:

- a) using antenna arrays to process radio signals of said open air-interfaces based on said open wireless BIOS signal processing architecture in both space and time to improve performance in presence of wireless fading and interference,
- ~~b) using beamforming algorithm to increase received signal over noise rate (SNR) for desired directions,~~
- ~~c) using diversity algorithm to combat fading in order to work at less SNR,~~
- d) using interference mitigation method to maximally reuse the channel frequencies and share the spectrum based on said open wireless BIOS signal processing architecture, and
- e) using spatial multiplexing algorithms to increase data speeds, ~~for example, multiple in and multiple out (MIMO)~~ with said open wireless BIOS signal processing architecture.

Claim 13 (Currently Amended)

A system as recited in claim 2 wherein said software definable module of said open air-interfaces in said wireless terminal device can be stored in or installed from said external memory card, or downloaded through said network interface unit (NIU) of said wireless terminal device based on said open wireless BIOS signal processing architecture.

Claim 14 (Currently Amended)

A system as recited in claim 3 wherein said convergence layer module further comprising:

- a) open service convergence including service-oriented mobility infrastructure across both wireline and wireless networks,
- b) open transport convergence including ~~internet protocol (IP)~~ enterprise convergence and ~~All IP~~ user end-to-end convergence, and

- c) open transmission convergence including adaptive modulation, adaptive coding and adaptive equalization of said open air-interfaces based on said open wireless BIOS signal processing architecture .

Claims 15-20 (Previous Cancelled)

Claim 21 (Currently Amended)

A system as recited in claim 1 wherein said wireless terminal device further comprising:

- a) ~~system hardware and peripherals including displayer, digital camera, sensors, smart antennas, security button, radiation detector, health detector, GPS (global position system) receiver and memory card,~~
- b) software detecting available wireless networks of said open air interfaces by said open wireless BIOS signal processing architecture in the service geographic area,
- c) software configuring the detected said wireless networks and installing the required modules of said open air interfaces with said open wireless BIOS signal processing architecture,
- d) software providing the information input methods for said wireless terminal device,
- e) software providing enhanced security solutions for said wireless terminal device,
- f) software providing connection methods for said wireless terminal device including traditional mobile networks, ad-hoc, broadcasting or user-defined topology,
- g) software defining user-preferred service mode based on quality-of-service, bandwidth, traffic model, billing model and application model,
- h) software providing safety solutions for said wireless terminal device,
- i) software supporting open spectrum management methods including spectrum sharing, spectrum recycling and multiple spectrum ownership of said open air interfaces,
- j) software providing optimized power management solutions to minimize said wireless terminal device power consumption including base-band processing, radio frequency modules, controllers as well as applications, and
- k) software supporting Voice-over-IP capability for said wireless terminal device.

Claim 22-26 (Cancelled)